High-Volume Concentration Standard Laboratory Module (SLM™)

General Overview of the High-Volume Concentration SLM

The High-Volume Concentrator (HVC) is an automated instrument for concentrating an organic liquid sample. The HVC automates the Kuderna-Danish (K-D) Snyder ball column concentrator that is designed to concentrate trace amounts of sample dissolved in organic solvents.

Environmental Protection Agency (EPA) Method

The HVC addresses parts of both EPA Method 3540 and EPA Method 3550.

Standard Analysis Method (SAM)

This SLM supports all organic SAM systems.

Advantages

The HVC SLM is an automated system developed for the Contaminant Analysis Automation Program. Pre-optimized testing on the system shows good recovery rates, accuracy, and concentration times in a system free of cross contamination. Increased reflux caused by the system's ultrasonic action allows simpler column designs that are easier to clean using automation.

General Description of the High-Volume Concentration SLM

The HVC uses ultrasonic power to create theoretical plates, thus replacing the manual Snyder ball concentration column. The ultrasonic waves move the escaping analyte to the walls of the column, where surface tension collects the analyte and removes it to the boiling chamber. Some solvent contacts the column walls and condenses, thus aiding in returning the analyte to the boiling chamber. The boiling chamber is coated with platinum heating elements. The heaters are controlled by individual process controllers. The efficiency of the platinum heating elements duplicates the even heat produced by the hot water bath of the K-D method.

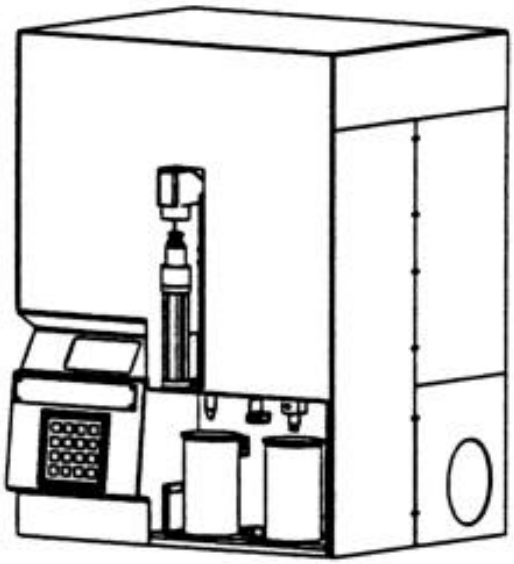

Figure 1. High-Volume Concentration Standard Laboratory Module

The HVC SLM accepts up to a 500-mL sample. After the sample is concentrated, the concentrate is moved to a transfer chamber, where the final volume can be raised to 10 mL by solvent addition. If 1 mL is desired, a nitrogen blowdown process in the transfer chamber is used to reduce the volume. Once the desired volume has been accurately achieved, the sample is transferred to an output vial.

Status

The HVC SLM has been tested and optimized for some specific applications. Validation for the concentration of polychlorinated biphenyls is complete. The HVC is currently available for licensing. Other arrangements such as Cooperative Research and Development Agreements are negotiable.

Industrial Partner

SciBus Analytical, Inc.

Developers

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Pacific Northwest Laboratories

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LALP-95-91
April 1995

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